<center>**REMARKS**</center>

Claims 1-6, 8-11, 13, 14, 17-22, and 23-42 are currently pending in the subject application and are presently under consideration. Claims 1, 10 and 21 have been amended while claims 15 and 23 have been canceled in this response as shown on pages 2-8 of the Reply. Applicants' representative thanks the Examiner for the teleconference of January 18, 2008 wherein it was conveyed that the proposed amendments overcome current rejections.

Favorable reconsideration of the subject patent application is respectfully requested in view of the comments and amendments herein.

I.   Rejection of Claims 1, 6 and 9 Under 35 U.S.C. §103(a)

Claims 1, 6 and 9 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Levy, et al. , *et al.* (US 6,088,524) in view of IBM Technical Disclosure Bulletin, March 1990, "Multiple Indexed Access Path in a Relational Database System", Vol. 32, Iss. 10B, pp. 388-392 (hereafter, "IBM"). Withdrawal of this rejection is requested for at least the following reasons. The cited documents alone or in combination do not teach or suggest all aspects of the subject claims.

The claimed subject matter generally relates to a query optimization wherein a predicate component that introduces into a query an extra predicate that is used as dictated by rules and is tied to index utilization. To this end independent claim 1 recites: *an optimizing component comprising at least a query component that receives a query to be processed against data of the data repository, which query includes an original predicate, the optimizing component requests a metadata engine an implication rule for a given column, or for a function on a given column by sending the metadata engine an expression to which the column or function on a column is to be compared, and a list of one or more indices that can be exploited.* The cited documents alone or in combination do not teach or suggest such claimed aspects.

In particular, Levy, et al., *et al.* relates to a method for manipulating aggregation predicates in database applications. New predicates are inferred from an initial set of predicates including the aggregation predicates in representative form. However, as conceded on page 20 of the subject Final Office Action, Levy, et al. , *et al.* does not teach or suggest requesting an implication rule for a column or function of the column by transmitting an expression to which the column or function of the column is to be compared.

The secondary document IBM fails to make up for this deficiency. IBM relates to utilizing all the possible indexes on the table to check as many of the query's predicates as possible, so that the result of the query can be derived in the most efficient way. It uses index intersection for conjunctive predicates (ANDed predicates), and index union for disjunctive predicates (OR predicates). For queries with both conjunctive predicates and disjunctive predicates, index intersection and index union are both used. However, IBM does not teach or suggest requesting an implication rule on a given column or function of the given column let alone suggest passing the column/function of the column, expression to be compared etc. to an entity providing the implication rule.

In contrast, the claimed subject matter rather than merely selecting indexed columns actually generates substitute predicates for existing predicates or implied predicates in which existing predicates are used in a manner that exploit indexes. In order to determine such substitute/implied predicates exploiting an index an optimization component requests for implication rules by sending to a metadata engine the expression to which a column/function of the column should be compared as well as indexes to be exploited. (*See* Fig.5 and related text of applicants' specification from page 8 line 15 – page 10 line 2). In this example, the expression transmitted is $p1 = @p2$, and as $p1$ is a non-indexable column, indices on other columns using $p1$ such as indices on columns $PrfxCompCol$ and $AnotherCompCol$, are transmitted as both exploit $p1$. Such claimed aspects are not taught or suggested either alone or in combination by the cited references.

In view of at least the foregoing, it is clear that none of the cited documents alone or in combination teach or suggest all aspects recited in the subject claims. Hence, withdrawal of this rejection is respectfully requested.

II.   **Rejection of Claim 2 Under 35 U.S.C. §103(a)**

Claim 2 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Levy, et al., in view of IBM, further in view of Larson, *et al.* (U.S. 6,381,616) hereafter, "Larson '616". It is respectfully requested that this rejection be withdrawn for at least the following reasons. The cited documents alone or in combination do not teach or suggest all features recited in the subject claims.

Claim 2 depends on independent claim 1. As stated *supra*, Levy, et al. , *et al.* and IBM do not teach or suggest all features of claim 1. Larson'616 relates to modifying or converting predicates involving a comparison with a string constant in a query so that the predicates can be evaluated by an external or remote source that uses a different collating sequence. But it does not makeup for the aforementioned deficiency of Levy, et al. , *et al.* and IBM with respect to independent claim 1. Therefore, withdrawal of this rejection is requested with respect to dependent claim 2.

III.   Rejection of Claims 3-5 Under 35 U.S.C. §103(a)

Claims 3-5 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Levy, et al., in view of IBM, further in view of Larson, *et al.* (U.S. 20030093415) hereafter, "Larson '415". It is respectfully requested that this rejection be withdrawn for at least the following reasons. The cited documents alone or in combination do not teach or suggest all features recited in the subject claims.

Claims 3-5 and 7 depend on independent claim 1. As stated *supra*, Levy, et al. , *et al.* and IBM fail to teach or suggest all features of claim 1. Larson'415 relates a transformation-based optimizer that generates rewritings by applying local algebraic transformation rules on subexpressions of the query. Application of a transformation rule produces substitute expressions that are logically equivalent to the original expression. In particular, a view matching rule (or rules) is disclosed, which determines whether the original query can be computed from one or more of the existing materialized views and, if so, generates substitute expressions. On pages 13 and 20 of the subject Final Office Action it is incorrectly contended that Larson'415 teaches transmitting an expression for comparison and one or more indices that can be exploited for the comparison in order to obtain implication rules. At the cited portion Larson'415 teaches three tests exploiting knowledge about column equivalences. The information is captured by computing a collection of equivalence classes from column equality predicates contained in the selection predicate. An equivalence class is a set of columns that are known to be equal and hence can be used inter-changeably in other predicates. However, it does not teach or suggest *an optimizing component comprising at least a query component that receives a query to be processed against data of the data repository, which query includes an original predicate, the optimizing component requests a metadata engine an implication rule for a given column, or*

for a function on a given column by sending the metadata engine an expression to which the column or function on a column is to be compared, and a list of one or more indices that can be exploited as recited in independent claim 1. As stated *supra*, in the discussion with respect to independent claim 1 the transmission of expression for column comparison and related indices helps to determine substitute/implied predicates exploiting an index.

From the foregoing, it is clear that Larson'415 does not makeup for the aforementioned deficiency of Levy, et al. , *et al.* and IBM with respect to independent claim 1. Hence, withdrawal of this rejection is requested with respect to dependent claims 3-5 and 7.

IV.   Rejection of Claims 8 and 42 Under 35 U.S.C. §103(a)

Claims 8 and 42 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Levy, et al. , in view of IBM, further in view of Dessloch, *et al.* (U.S. 6,338,056). It is respectfully requested that this rejection be withdrawn for at least the following reasons. The cited documents alone or in combination do not teach or suggest all features recited in the subject claims.

Claims 8 and 42 depend on independent claim 1. As stated *supra*, Levy, et al. , *et al.* and IBM do not teach or suggest all features of claim 1. Dessloch, *et al.* relates to indexing semi-structured, non-traditional data using an external search engine accessible to a database engine through a standardized interface. But it does not makeup for the aforementioned deficiency of Levy, et al. , *et al.* and IBM with respect to independent claim 1. Therefore, withdrawal of this rejection is requested with respect to dependent claims 8 and 42.

V.   Rejection of Claims 10-11, 13-15 and 17-18 Under 35 U.S.C. §103(a)

Claims 10-11, 13-15 and 17-18 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Levy, et al. , in view of IBM, Larson '616, and Larson '415. It is respectfully requested that this rejection be withdrawn for at least the following reasons. The cited documents alone or in combination do not teach or suggest all features recited in the subject claims.

The claimed subject matter generally relates to a query optimization wherein a predicate component that introduces into a query an extra predicate that is used as dictated by rules and is tied to index utilization. To this end, independent claim 10 recites: *an optimizing component*

comprising at least a query component that receives a query to be processed against data of the data repository, which query includes an original predicate, the optimizing component requests a metadata engine an implication rule for a given column, or for a function on a given column by sending the metadata engine an expression to which the column or function on a column is to be compared, and a list of one or more indices that can be exploited. The cited documents alone or in combination do not teach or suggest such claimed aspects.

As stated *supra*, Levy, *et al.* and IBM do not teach or suggest the aforementioned claimed aspects. Larson'616 relates to modifying or converting predicates involving a comparison with a string constant in a query so that the predicates can be evaluated by an external or remote source that uses a different collating sequence. But it does not makeup for the aforementioned deficiency of Levy, *et al.* and IBM with respect to independent claim 10. On page 13 of the subject Final Office Action it is erroneously contended that the third reference Larson'415 teaches the aforementioned claimed aspects. Rather at the cited portion Larson'415 teaches gaining knowledge about column equivalences by computing a collection of equivalence classes from column equality predicates contained in the selection predicate. An equivalence class is defined by Larson'415 as, a set of columns that are known to be equal and hence can be used inter-changeably in other predicates. However, it does not teach or suggest using implication rules and column indices to identify substitute/implied predicates as recited in the independent claim 10.

In accordance with the claimed subject matter, substitute predicates for existing predicates or implied predicates are identified or generated. In order to determine such substitute/implied predicates exploiting an index an optimization component requests for implication rules by sending to a metadata engine the expression to which a column/function of the column should be compared as well as indexes to be exploited. (*See* Fig.5 and related text of applicants' specification from page 8 line 15 – page 10 line 2). Such aspects are not taught or suggested either alone or in combination by any of the cited references. Hence, withdrawal of this rejection is requested with respect to independent claim 10 as well all claims that depend there from.

VI.   Rejection of Claim 20 Under 35 U.S.C. §103(a)

Claim 20 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Levy, et al. , in view of IBM, Larson '616, and Larson '415, further in view of Reiner, *et al.* (U.S. 5,742,806). It is respectfully requested that this rejection be withdrawn for at least the following reasons. The cited documents alone or in combination do not teach or suggest all features recited in the subject claims.

Claim 20 depend from independent claim 10. As stated *supra*, Levy, *et al.,* IBM, Larson'616 and Larson'415 do not teach or suggest all features of claim 10. Reiner, *et al.* relates to "query decomposition" wherein database queries are intercepted prior to processing by a database management system ("DBMS"). The system decomposes at least selected queries to generate multiple subqueries for application, in parallel, to the DBMS, in lieu of the intercepted query. Responses by the DBMS to the subqueries are assembled by the system to generate a final response (*See* Reiner, *et al.* Abstract). But it does not makeup for the aforementioned deficiency of Levy, *et al.,* IBM, Larson '616, and Larson '415 with respect to independent claim 10. Therefore, withdrawal of this rejection is requested with respect to dependent claim 20.

VII.   Rejection of Claim 19 Under 35 U.S.C. §103(a)

Claim 19 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Levy, et al. , in view of IBM, Larson '616, and Larson '415, further in view of Lin, *et al.* (US 6,675,159). It is respectfully requested that this rejection be withdrawn for at least the following reasons. The cited documents alone or in combination do not teach or suggest all features recited in the subject claims.

Claim 19 depends from independent claim 10. As stated *supra*, Levy, *et al.,* IBM, Larson'616 and Larson'415 do not teach or suggest all features of claim 10. Lin, *et al.* relates to indexing collections of documents with ontology-based predicate structures through automated or human-assisted methods. But it does not makeup for the aforementioned deficiency of Levy, *et al.,* IBM, Larson'616 and Larson'415 with respect to independent claim 10. Therefore, withdrawal of this rejection is requested with respect to dependent claim19.

VIII.   Rejection of Claims 21 and 31 Under 35 U.S.C. §103(a)

Claim 21 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Levy, et al. , in view of IBM, Larson '616, and Lin, *et al.* It is respectfully requested that this rejection be withdrawn for at least the following reasons. The cited documents alone or in combination do not teach or suggest all features recited in the subject claims.

The claimed subject matter generally relates to a system that facilitates allowing a query optimizing component to infer a simple comparison on an indexed column from another predicate condition. This occurs by introducing into a query, extra predicates are used as dictated by rules that are received by the metadata component. To this end independent claim 21 recites: *requesting an implication rule for a column or a function of a column by transmitting at least one of an expression to which the column or the function on a column is to be compared and a list of one or more standard indices or one or more multi-valued indices that could be utilized for the comparison.* The cited documents alone or in combination do not teach or suggest such claimed aspects.

As stated *supra*, Levy, *et al.* relates to a method for manipulating aggregation predicates in database applications but does not teach or suggest requesting implication rules as recited in the independent claim 21. IBM relates to utilizing all the possible indexes on the table to check as many of the query's predicates as possible, so that the result of the query can be derived in the most efficient way. However, IBM does not teach or suggest requesting an implication rule on a given column or function of the given column let alone suggest passing the column/function of the column, expression to be compared etc. to an entity providing the implication rule.

Larson'616 relates to modifying or converting predicates involving a comparison with a string constant in a query so that the predicates can be evaluated by an external or remote source that uses a different collating sequence. But it does not makeup for the aforementioned deficiency of Levy, *et al.* with respect to independent claim 21. The third reference Larson'415 selects subexpressions based on a view matching rule which determines from which materialized views, if any, the given expression can be computed. However, it does not teach or suggest receiving implication rules in response to transmitting expressions for columns or functions of columns and one or more indices as recited in the subject claims.

In view of at least the foregoing, it is clear that none of the cited documents teach or suggest all aspects recited in the subject claims. Therefore, this rejection should be withdrawn with respect claim 21 and claim 31 that depends there from.

IX.   Rejection of Claims 22-24, 28, 29, 34, 38 and 39 Under 35 U.S.C. §103(a)

Claims 22-24, 28, 29, 34, 38 and 39 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Levy, et al. , in view of IBM, Larson '616, and Lin, *et al.,* further in view of Larson '415. It is respectfully requested that this rejection be withdrawn for at least the following reasons. Claims 22-24, 28, and 29 depend from independent claim 21 while claims 38 and 39 depend from independent claim 34. None of the cited references alone or in combination teaches or suggests all aspects recited in the subject independent claims.

The claimed subject matter generally relates to a system that facilitates allowing a query optimizing component to infer a simple comparison on an indexed column from another predicate condition. This occurs by introducing into a query, extra predicates are used as dictated by rules that are received by the metadata component. To this end independent claims 21 and 34 recite similar features namely: ***means for requesting an implication rule for a column or function on a column; means for transmitting at least one of an expression to which a column or function on a column is to be compared and a list of standard indices or multi-valued indices that could be exploited.*** As discussed *supra*, none of the cited references alone or in combination teach or suggest such claimed aspects. In view of at least the foregoing, withdrawal of this rejection is respectfully requested.

X.   Rejection of Claims 25 and 26 Under 35 U.S.C. §103(a)

Claims 25 and 26 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Levy, et al. , in view of Larson '616, IBM and Lin, *et al.,* and further in view of Pauschine, *et al.* (U.S. 5,918,232). It is respectfully requested that this rejection be withdrawn for at least the following reasons. The cited documents alone or in combination do not teach or suggest all features recited in the subject claims.

Claims 25 and 26 depend from independent claim 21. As stated *supra*, Levy, *et al.,* IBM, Larson'616 and Lin, *et al.* do not teach or suggest all features of claim 21. Pauschine, *et al.* relates to a system and method for computer modeling and for creating hyperstructures which are

obtain measurements of physical objects and activities related to an entity to be modeled. But it does not makeup for the aforementioned deficiency of Levy, *et al.*, IBM, Larson'616 and Lin, *et al.* with respect to independent claim 21. Therefore, withdrawal of this rejection is requested with respect to dependent claims 25 and 26.

XI.   **Rejection of Claims 27 and 30 Under 35 U.S.C. §103(a)**

Claims 27 and 30 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Levy, et al. , in view of Larson'616, IBM and Lin, *et al.*, further in view of Paulley, *et al.* (US 6,665,664). It is respectfully requested that this rejection be withdrawn for at least the following reasons. The cited documents alone or in combination do not teach or suggest all features recited in the subject claims.

Claims 27 and 30 depend from independent claim 21. As stated *supra*, Levy, *et al.,* IGM, Larson'616 and Lin, *et al.* do not teach or suggest all features of claim 21. Paulley, *et al.* relates to query optimization techniques that selectively normalize segments of a query based on a determination of whether it is advantageous to fully convert each given segment to conjunctive normal form(CNF) (*See* Paulley, *et al.* Abstract). But it does not makeup for the aforementioned deficiency of Levy, *et al.,* IBM, Larson'616 and Lin, *et al.* with respect to independent claim 21. Therefore, withdrawal of this rejection is requested with respect to dependent claims 27 and 30.

XII.   **Rejection of Claim 32 Under 35 U.S.C. §103(a)**

Claim 32 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Levy, et al. , in view of Larson'616, IBM and Lin, further in view of Reiner, *et al.* It is respectfully requested that this rejection be withdrawn for at least the following reasons. The cited documents alone or in combination do not teach or suggest all features recited in the subject claims.

Claim 32 depends from independent claim 21. Reiner, *et al.* relates to "query decomposition" wherein database queries are intercepted prior to processing by a database management system ("DBMS"). The system decomposes at least selected queries to generate multiple subqueries for application, in parallel, to the DBMS, in lieu of the intercepted query. Responses by the DBMS to the subqueries are assembled by the system to generate a final response (*See* Reiner, *et al.* Abstract). But it does not makeup for the aforementioned deficiency

of Levy, *et al.,* IBM, Larson'616 and Lin, *et al.* with respect to independent claim 21. Therefore, withdrawal of this rejection is requested with respect to dependent claim 32.

XIII.   Rejection of Claim 33 Under 35 U.S.C. §103(a)

Claim 33 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Levy, et al. , in view of Larson'616, IBM and Lin, further in view of Leslie, *et al.* (US 5,778,354). It is respectfully requested that this rejection be withdrawn for at least the following reasons. The cited documents alone or in combination do not teach or suggest all features recited in the subject claims.

Claim 33 depends from independent claim 21. Leslie, *et al.* relates to a database management system with a multi-dimensional indexed accessing capability using keyed index searching (*See* Leslie, *et al.* Abstract). But it does not makeup for the aforementioned deficiency of Levy, *et al.,* IBM, Larson'616 and Lin, *et al.* with respect to independent claim 21. Therefore, withdrawal of this rejection is requested with respect to dependent claim 33.

XIV.   Rejection of Claims 35 and 36 Under 35 U.S.C. §103(a)

Claims 35 and 36 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Levy, et al. , Larson '616, Larson '415, IBM and Lin, *et al.*, and as applied to claim 34 above, further in view of Pauschine, *et al.* It is respectfully requested that this rejection be withdrawn for at least the following reasons. The cited documents alone or in combination do not teach or suggest all features recited in the subject claims.

Claims 35 and 36 depend from independent claim 34. As stated *supra*, Levy, *et al.*, IGM, Larson '616, Lin, *et al.*, and Larson '415 do not teach or suggest all features of claim 34. Pauschine, *et al.* relates to a system and method for computer modeling and for creating hyperstructures which are obtain measurements of physical objects and activities related to an entity to be modeled. But it does not makeup for the aforementioned deficiency of Levy, *et al.*, IBM, Larson '616, Lin, *et al.*, and Larson '415 with respect to independent claim 34. Therefore, withdrawal of this rejection is requested with respect to dependent claims 35 and 36.

XV.   Rejection of Claim 37 Under 35 U.S.C. §103(a)

Claim 37 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Levy, et al. , Larson '616, Larson '415, IBM and Lin, *et al.*, further in view of Paulley, *et al.* It is respectfully requested that this rejection be withdrawn for at least the following reasons. The cited documents alone or in combination do not teach or suggest all features recited in the subject claims.

Claim 37 depends from independent claim 34. As stated *supra*, Levy, *et al.*, IBM, Larson '616, Lin, *et al.*, and Larson '415 do not teach or suggest all features of claim 21. Paulley, *et al.* relates to query optimization techniques that selectively normalize segments of a query based on a determination of whether it is advantageous to fully convert each given segment to conjunctive normal form(CNF) (*See* Paulley, *et al.* Abstract). But it does not makeup for the aforementioned deficiency of Levy, *et al.,* IBM, Larson '616 and Lin, *et al.* with respect to independent claim 34. Therefore, withdrawal of this rejection is requested with respect to dependent claim 37.

XVI.   Rejection of Claims 40 and 41 Under 35 U.S.C. §103(a)

Claims 40 and 41 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Levy, et al. , Larson '616, Larson '415, IBM and Lin, *et al.*, further in view of Reiner, *et al.* It is respectfully requested that this rejection be withdrawn for at least the following reasons. The cited documents alone or in combination do not teach or suggest all features recited in the subject claims.

Claims 40 and 41 depend from independent claim 34. Reiner, *et al.* relates to "query decomposition" wherein database queries are intercepted prior to processing by a database management system ("DBMS"). The system decomposes at least selected queries to generate multiple subqueries for application, in parallel, to the DBMS, in lieu of the intercepted query. Responses by the DBMS to the subqueries are assembled by the system to generate a final response (*See* Reiner, *et al.* Abstract). But it does not makeup for the aforementioned deficiency of Levy, *et al.*, IBM, Larson '616, Lin, *et al.*, and Larson '415 with respect to independent claim 34. Therefore, withdrawal of this rejection is requested with respect to dependent claims 40 and 41.

CONCLUSION

The present application is believed to be in condition for allowance in view of the above comments and amendments. A prompt action to such end is earnestly solicited.

In the event any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063 [MSFTP576US].

Should the Examiner believe a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact applicants' undersigned representative at the telephone number below.

Respectfully submitted,

AMIN, TUROCY & CALVIN, LLP

/Himanshu S. Amin/

Himanshu S. Amin

Reg. No. 40,894

AMIN, TUROCY & CALVIN, LLP
24TH Floor, National City Center
1900 E. 9TH Street
Cleveland, Ohio 44114
Telephone (216) 696-8730
Facsimile (216) 696-8731